

## EDITOR'S PAGE

## The Case for Live Case Demonstrations

The discussion of whether interventional cases should be demonstrated and transmitted is as old as interventional cardiology itself. In fact, it precedes interventional cardiology, as the surgical “theater” was indeed a place for the “show.” Demonstration has been accepted as a critical component of the educational process in our specialty. The dual objectives of live case demonstration, the care of the patient, and the instruction of others, are not a balanced goal, because the care of the patient must always be primary. I have discussed this topic in this space previously (1), and attempts at studying the safety and value (2) have generally come down on the side of the worth of live cases, although such assessments are perhaps not without some bias. I have been witness to situations in which the safety of the patient did not seem to have been the primary goal, and this should never be repeated.

Believing that there is educational value in live case demonstrations, the American College of Cardiology began a monthly broadcast of such cases from Mount Sinai Hospital in New York 1 year ago. These cases are widely viewed, and recently I was invited to return to Mount Sinai to participate in the 1-year anniversary procedure, to be performed by Drs. Samin Sharma and Annapoorna Kini. These high-volume operators often make complex cases look easy, given their expertise and the high-performance technology that is available to us. Indeed, many live cases performed in training courses around the world look pretty routine. On this day, there was to be nothing routine. The selection of the patient was appropriate: a patient with significant angina pectoris who had severe in-stent restenosis and a drug-eluting stent placed in the proximal left anterior descending coronary artery (LAD) 7 years previously. Surgery had been performed even earlier, and the grafts, including the left internal mammary artery to the LAD, had all become occluded. Revascularization was needed for refractory symptoms, and repeat surgery was possible but problematic because the internal mammary artery was no longer available. The very late restenosis (7 years) raised the question of whether this could represent neoatherosclerosis. Imaging with intravascular ultrasound and near-infrared catheterization established that there was complete expansion of the stent and significant lipid content. Optical coherence tomography showed a thin fibrous cap over the in-stent restenotic lesion. Whereas intravascular ultrasound is needed for the evaluation of in-stent restenosis to establish if stent underexpansion is a problem, the investigation of possible neoatherosclerosis is in its early evolution, and how to change the approach to such lesions is unknown. The details of the case can be viewed on [CardioSource.org](http://CardioSource.org), but the first inflation of the balloon in the lesion led to occlusion of the circumflex and ultimately poor perfusion of the left system. Re-establishing flow was extremely difficult, and deteriorating hemodynamic status necessitated simultaneous insertion of a balloon pump by a second team while attempts at restoring flow continued. Further deterioration led to profound hypotension, cardiac arrest, cardiopulmonary resuscitation, defibrillation, enlisting anesthesia support, and surgical establishment of extracorporeal membrane oxygenation. With improvement of hemodynamic status, the left coronary system patency could be restored, and the patient began to stabilize.

This patient would not have survived this complication in hospitals without comprehensive support of personnel and equipment that was available. So what is to be learned from a live case demonstration? Should they be done, or should only well-crafted teaching points be shown? As I left the laboratory to allow room for the surgeons to work, I was asked to comment on the case, not at all sure of the outcome. I related another live case from more than 32 years ago. It was the last procedure in the first course at Emory. Andreas Gruentzig was the operator, and I was moderating in front of an audience of aspiring interventionalists. The patient had a severe but discrete lesion about 2 cm down the LAD. Nothing else. Andreas said that for those who were starting angioplasty, this is the kind of case they should choose. It was easily accessible to the fixed-wire Gruentzig balloon, which could hardly be directed at all, and often dependent on aiming the



**Spencer B. King III,  
MD, MACC**

Editor-in-Chief,  
*JACC: Cardiovascular  
Interventions*

*Whether to  
perform live case  
demonstrations or  
not will continue to  
be discussed, but my  
view is that, as  
diligent as we  
must be to avoid  
complications,  
it is from these  
adversities that we  
learn the most.*

guiding catheter toward the LAD or circumflex artery. The lesion was short, and therefore balloon dilation should have cracked and displaced it nicely, leaving an adequate lumen. With the first balloon inflation, there was no flow down the LAD. Shortly thereafter, hypotension and ventricular fibrillation ensued. I remember the audience's response was a collective gasp, even if inaudible. As the paddles came out to perform defibrillation, I cut the transmission, and off the patient went to the operating room. Later, when Andreas rejoined me in the auditorium, we reflected on what happened. We always believed that this case may have been the most educational of the course. We speculated that a significant number of people in the room would decide that interventional cardiology was not for them, and that may have been a blessing.

What value was provided by this live case demonstration? Would it have happened if the case had not been transmitted? I think what was learned, as has been learned by all experienced operators, was that we must expect the unexpected. In the early days, complications were frequent, and therefore this lesson was constantly being reinforced. Now most cases, even at live demonstration courses, go smoothly, and the impression may be given that interventional cardiology is easy. It has always been clear to me that the lack of complications in routine situations is not an adequate measure of quality. It is in the most difficult and unexpected settings that operators and systems are really tested. I have landed a commercial jetliner

(actually a simulator) under controlled conditions. I am sure the passengers on Captain Chesley Sullenberger's plane were appreciative of the training, skills, and systems in place enabling him to land safely in the Hudson River.

None of us want to encounter a case like the one at Mount Sinai Hospital, but it is always lurking out there. Fortunately, the news is good. The patient "miraculously" recovered and was eventually discharged in good shape. The miracle, however, was possible only because of a well-developed system to cope with the unexpected. Whether to perform live case demonstrations or not will continue to be discussed, but my view is that, as diligent as we must be to avoid complications, it is from these adversities that we learn the most.

---

**Address correspondence to:**

Spencer B. King III, MD  
Saint Joseph's Heart and Vascular Institute  
5665 Peachtree Dunwoody Road NE  
Atlanta, Georgia 30342  
[spencer.king@emoryhealthcare.org](mailto:spencer.king@emoryhealthcare.org)

**REFERENCES**

1. King SB III. All the world's a stage. *J Am Coll Cardiol Interv* 2012;5:246-7.
2. Eliyahu S, Roguin A, Kerner A. Patient safety and outcomes from live case demonstrations of interventional cardiology procedures. *J Am Coll Cardiol Interv* 2012;5:215-24.